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Chelan County, Washington

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NATIONAL EUTROPHICATION SURVEY

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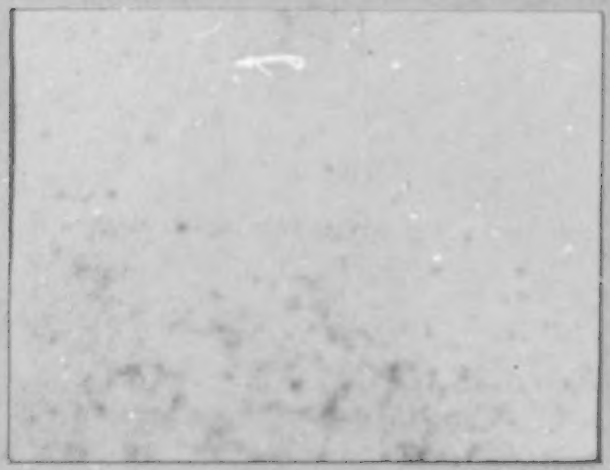

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16. ABSTRACT

Annual total phosphorus and total nitrogen loadings to the lake were estimated and subdivided according to either point or non-point source origin. An assessment of the lake's trophic condition and limiting nutrient is also provided. All data collected by the U.S.E.P.A. National Eutrophication Survey during the one year study of the lake and its tributaries are included in the report.

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REPORT

ON

LAKE CHELAN

CHELAN COUNTY

WASHINGTON

EPA REGION X

WORKING PAPER No. 866

WITH THE COOPERATION OF THE

WASHINGTON DEPARTMENT OF ECOLOGY

AND THE

WASHINGTON NATIONAL GUARD

DECEMBER, 1977

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FOREWORD

The National Eutrophication Survey was initiated in 1972 in response to an Administration commitment to investigate the nationwide threat of accelerated eutrophication to freshwater lakes and reservoirs.

OBJECTIVES

The Survey was designed to develop, in conjunction with state environmental agencies, information on nutrient sources, concentrations, and impact on selected freshwater lakes as a basis for formulating comprehensive and coordinated national, regional, and state management practices relating to point source discharge reduction and nonpoint source pollution abatement in lake watersheds.

ANALYTIC APPROACH

The mathematical and statistical procedures selected for the Survey's eutrophication analysis are based on related concepts that:

a. A generalized representation or model relating sources, concentrations, and impacts can be constructed.

b. By applying measurements of relevant parameters associated with lake degradation, the generalized model can be transformed into an operational representation of a lake, its drainage basin, and related nutrients.

c. With such a transformation, an assessment of the potential for eutrophication control can be made.

LAKE ANALYSIS

In this report, the first stage of evaluation of lake and watershed data collected from the study lake and its drainage basin is documented. The report is formatted to provide state environmental agencies with specific information for basin planning [§303(e)], water quality criteria/standards review [§303(c)], clean lakes [§314(a,b)], and water quality monitoring [§106 and §305(b)] activities mandated by the Federal Water Pollution Control Act Amendments of 1972.

Beyond the single lake analysis, broader based correlations between nutrient concentrations (and loading) and trophic condition are being made to advance the rationale and data base for refinement of nutrient water quality criteria for the Nation's freshwater lakes. Likewise, multivariate evaluations for the relationships between land use, nutrient export, and trophic condition, by lake class or use, are being developed to assist in the formulation of planning guidelines and policies by the U.S. Environmental Protection Agency and to augment plans implementation by the states.

ACKNOWLEDGMENTS

The staff of the National Eutrophication Survey (Office of Research and Development, U.S. Environmental Protection Agency) expresses sincere appreciation to the Washington Department of Ecology for professional involvement, to the Washington National Guard for conducting the tributary sampling phase of the Survey, and to those Washington wastewater treatment plant operators who provided effluent samples and flow data.

Ms. Barbara Blau, Lake Restoration Program, and the staff of the Washington Department of Ecology, Lake Restoration Program, provided invaluable lake documentation and counsel during the Survey, reviewed the preliminary reports and provided critiques most useful in the preparation of this Working Paper Series.

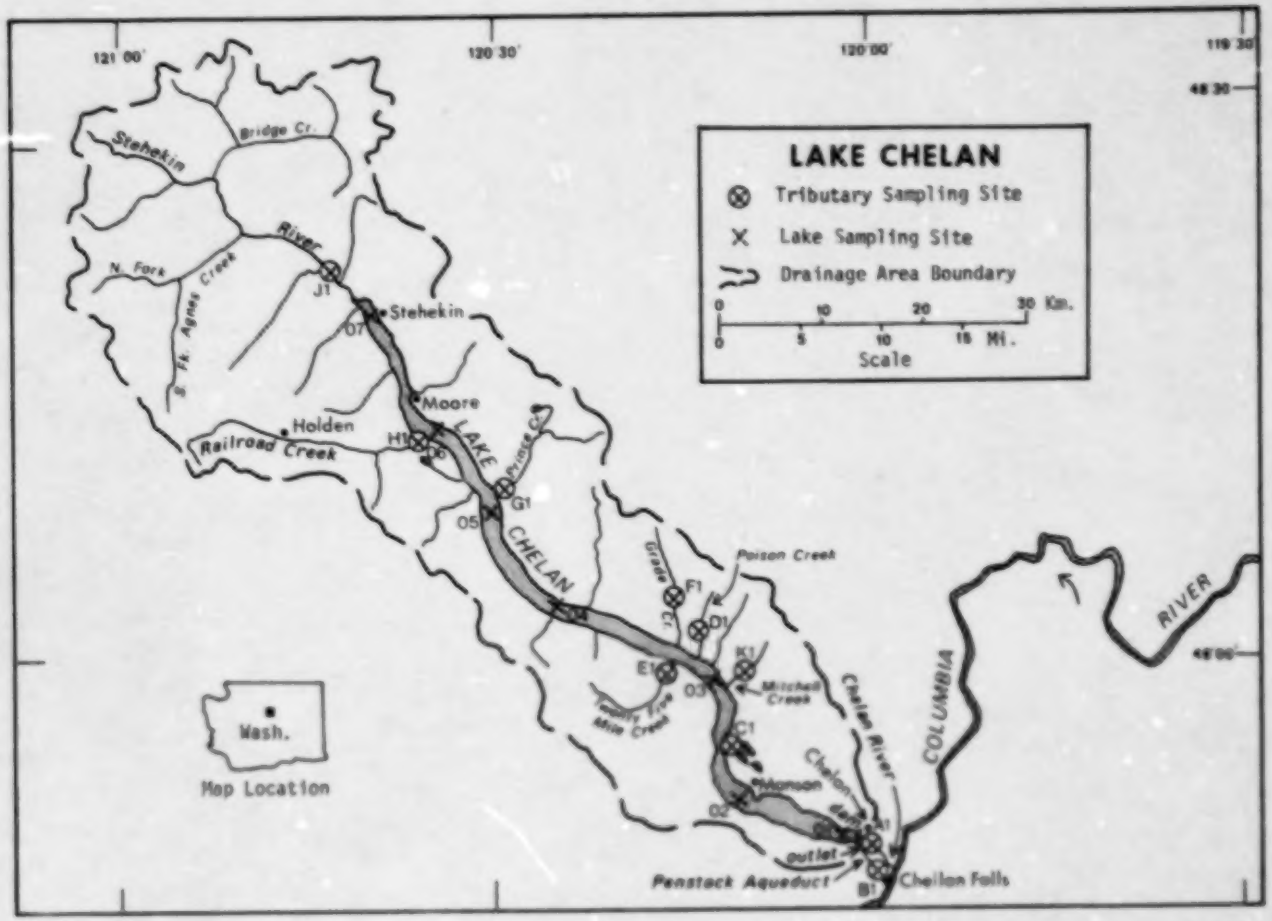
Major General Howard S. McGee, Adjutant General of Washington, and Project Officer Colonel Clinton C. Johnson, who directed the volunteer efforts of the Washington National Guardsmen, are also gratefully acknowledged for their assistance to the Survey.

NATIONAL EUTROPHICATION SURVEY

STUDY LAKES

STATE OF WASHINGTON

LAKE NAME	COUNTY
American Lake	Pierce
Banks Lake	Grant, Douglas
Chelan Lake	Chelan
Diamond Lake	Pend Oreille
Green Lake	King
Keechelus Lake	Kittitas
Mayfield Lake	Lewis
Medical Lake	Spokane
Moses Lake	Grant
Ozette Lake	Clallam
Sammamish Lake	King
Lake Whatcom	Whatcom
Lower Granite Reservoir	Garfield, Whatcom


LAKE CHELAN
Tributary Sampling Site
Lake Sampling Site
Drainage Area Boundary
0 10 20 30 Km.
0 5 10 15 Mi.
Scale
121 00'
120 30'
120 00'
119 30'
48 30'
48 00'
Stehekin
Bridge Cr.
River
N. Fork
S. Fk. Agnes Creek
J1
Stehekin
O7
Moore
Holden
H1
Railroad Creek
LAKE CHELAN
G1
O5
Prince Cr.
Poison Creek
F1
O1
E1
O3
K1
Mitchell Creek
Lucerne
Rocky Top
Mile Creek
C1
Chelan River
Manson
O2
outlet
Penstock Aqueduct
B1
Chelan Falls
COLUMBIA
RIVER
Wash.
Map Location

LAKE CHELAN

STORET NO. 5303

I. CONCLUSIONS

A. Trophic Condition*:

Survey data indicate that Lake Chelan is oligotrophic. It ranked first in overall trophic quality among the 13 Washington lakes and reservoirs sampled in 1975 when compared using a combination of six water quality parameters**. None of the other water bodies had less median total phosphorus or mean chlorophyll a, one had less median orthophosphorus, four had less median inorganic nitrogen, but none of the others had greater mean Secchi disc transparency. No significant depression of dissolved oxygen with depth occurred at any of the sampling stations or times.

B. Rate-Limiting Nutrient:

The algal assay results indicate the lake was phosphorus limited at the time the sample was collected (09/11/75). The lake data indicate phosphorus limitation in April and September but nitrogen limitation in July.

C. Nutrient Controllability:

1. Point sources--The septic-tank phosphorus contributions of the community of Manson and those serving lakeshore dwellings amounted to an estimated 1.7% of the total phosphorus input to

---

* Trophic assessment is based on the levels of nutrients, dissolved oxygen, and chlorophyll a; phytoplankton kinds and numbers; and transparency (Allum et al., 1977).

** See Appendix A.

Lake Chelan during the sampling year. However, additional study would be necessary to determine the significance of those sources.

The estimated phosphorus loading of 0.26 g/m^2/year is a little more than that proposed by Vollenweider (Vollenweider and Dillon, 1974) as an oligotrophic loading (see page 12).

2. Non-point sources--Non-point sources accounted for 98.3% of the total phosphorus load during the sampling year. The Stehekin River contributed 51.5%, Railroad Creek contributed 5.8%, and the ungaged minor tributaries and immediate drainage contributed an estimated 34.2%.

II. LAKE AND DRAINAGE BASIN CHARACTERISTICS†

A. Morphometry††:

1. Surface area: 133.90 kilometers².
2. Mean depth: unknown
3. Maximum depth: 466.0 meters.
4. Volume: unknown.

B. Tributary and Outlet (Anonymous, 1976):

1. Tributaries -

Name	Drainage area (km²)*	Mean flow (m³/sec)*
Stehekin River	891.0	40.47
Railroad Creek	172.0	5.78
Minor tributaries & immediate drainage -	1,196.0	15.69
Totals	2,259.0	61.94**

2. Outlet -

Aqueduct	-	0.43
Chelan River	2,393.0	58.59
Total	2,393.0***	59.02

C. Precipitation****:

1. Year of sampling: 30.3 centimeters.
2. Mean annual: 27.7 centimeters.

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† Table of metric equivalents--Appendix B.
†† Wolcott, 1973; max. depth from Whetten, 1967.
* For limits of accuracy, see Working Paper No. 175, "... Survey Methods, 1973-1976".
** Inflows adjusted to equal outflows plus evaporation.
*** Includes area of lake.
**** See Working Paper No. 175.

III. WATER QUALITY SUMMARY

Lake Chelan was sampled three times during the open-water season of 1975 by means of a pontoon-equipped Huey helicopter. Each time, samples for physical and chemical parameters were collected from a number of depths at six stations on the lake in July and from seven stations in April and September (see map, page v). During each visit, a single depth-integrated (4.6 m to surface) sample was composited from the stations for phytoplankton identification and enumeration; and during the last visit, two 18.9-liter depth-integrated samples were composited for algal assays. Also each time, a depth-integrated sample was collected from each of the stations for chlorophyll a analysis. The maximum depths sampled were 11.6 meters at station 1 and 67.1 meters at each of the other six stations.

The sampling results are presented in full in Appendix C and are summarized in the following table.

A. SUMMARY OF PHYSICAL AND CHEMICAL CHARACTERISTICS FOR CHELAN LAKE
STORET CODE 5303

PARAMETER	1ST SAMPLING (4/ 2/75) 7 SITES RANGE	MEAN	MEDIAN	2ND SAMPLING (7/21/75) 6 SITES RANGE	MEAN	MEDIAN	3RD SAMPLING (9/11/75) 7 SITES RANGE	MEAN	MEDIAN
TEMP (C)	5.7 - 5.8	5.7	5.7	4.9 - 19.1	11.1	10.6	7.0 - 20.2	15.0	15.8
DISS OXY (MG/L)	10.8 - 12.0	11.3	11.2	9.0 - 11.6	10.7	10.9	8.6 - 11.2	9.9	9.8
CNDCTVY (MCROMO)	31. - 35.	33.	33.	29. - 49.	38.	37.	33. - 49.	42.	43.
PH (STAND UNITS)	7.1 - 7.6	7.3	7.3	7.3 - 7.9	7.6	7.6	6.9 - 8.0	7.3	7.3
TOT ALK (MG/L)	11. - 25.	18.	18.	18. - 39.	24.	24.	16. - 45.	23.	21.
TOT P (MG/L)	0.002 - 0.011	0.006	0.006	0.005 - 0.021	0.006	0.005	0.003 - 0.011	0.005	0.004
ORTHO P (MG/L)	0.002 - 0.009	0.003	0.002	0.003 - 0.015	0.009	0.010	0.002 - 0.010	0.003	0.002
NO2+NO3 (MG/L)	0.050 - 0.090	0.069	0.070	0.020 - 0.080	0.046	0.050	0.020 - 0.070	0.030	0.020
AMMONIA (MG/L)	0.020 - 0.030	0.023	0.020	0.020 - 0.040	0.024	0.020	0.020 - 0.020	0.020	0.020
KJEL N (MG/L)	0.200 - 0.200	0.200	0.200	0.200 - 0.200	0.200	0.200	0.200 - 0.600	0.212	0.200
INORG N (MG/L)	0.070 - 0.120	0.092	0.090	0.040 - 0.120	0.069	0.070	0.040 - 0.090	0.050	0.040
TOTAL N (MG/L)	0.250 - 0.290	0.264	0.270	0.220 - 0.280	0.246	0.250	0.220 - 0.620	0.243	0.220
CHLRPYL A (UG/L)	0.3 - 0.3	0.3	0.3	0.9 - 1.7	1.3	1.3	0.9 - 1.4	1.2	1.2
SECCHI (METERS)	5.8 - 11.0	9.4	9.4	4.6 - 6.4	5.4	5.2	11.0 - 15.2	14.1	15.2

B. Biological characteristics:

1. Phytoplankton -

Sampling Date	Dominant Genera	Algal Units per ml
04/02/75	1. Asterionella sp.	374
	2. Tabellaria sp.	166
	3. Cyclotella sp.	146
	4. Cymbella sp.	21
	5. Oocystis sp.	21
	Total	728
07/21/75	1. Tabellaria sp.	262
	2. Asterionella sp.	105
	3. Chlorophytan colonies	79
	4. Aphanothece sp.	26
	Total	472
09/11/75	1. Tabellaria sp.	122
	Total	122

2. Chlorophyll a -

Sampling Date	Station Number	Chlorophyll a (µg/l)
04/02/75	1	0.3
	2	0.3
	3	0.3
	4	0.3
	5	0.3
	6	0.3
	7	0.3
07/21/75	1	1.5
	2	1.2
	3	1.7
	4	-
	5	1.4
	6	0.9
	7	1.0
09/11/75	1	1.3
	2	1.3
	3	1.2
	4	0.9
	5	1.0
	6	1.4
	7	1.2

C. Limiting Nutrient Study:

1. Autoclaved, filtered, and nutrient spiked -

a. Stations 1, 2, 6, and 7

Spike (mg/l)	Ortho P Conc. (mg/l)	Inorganic N Conc. (mg/l)	Maximum yield (mg/l-dry wt.)
Control	0.005	0.075	0.4
0.050 P	0.055	0.075	3.2
0.050 P + 1.0 N	0.055	1.075	14.4
1.0 N	0.005	1.075	0.3

b. Stations 3, 4, and 5

Spike (mg/l)	Ortho P Conc. (mg/l)	Inorganic N Conc. (mg/l)	Maximum yield (mg/l-dry wt.)
Control	0.005	0.070	0.3
0.050 P	0.055	0.070	2.9
0.050 P + 1.0 N	0.055	1.070	9.9
1.0 N	0.005	1.070	0.3

2. Discussion -

The control yields of the assay alga, Selenastrum capricornutum, indicate that the potential primary productivity of Lake Chelan was moderate at the time samples were collected (09/11/75). Also, the significant increases in yields with the addition of orthophosphorus alone indicate phosphorus limitation at that time. Note that the addition of nitrogen alone resulted in yields not significantly different from those of the controls.

The lake data indicate phosphorus limitation in April and September; i.e., the mean inorganic nitrogen/orthophosphorus ratios were 17/1 or greater. However, nitrogen limitation is indicated in July; i.e., the mean N/P ratio was 8/1, and nitrogen limitation would be expected (N/P ratios of 14/1 or greater generally indicate phosphorus limitation).

IV. NUTRIENT LOADINGS
(See Appendix D for data)

For the determination of nutrient loadings, the Washington National Guard collected monthly near-surface grab samples from each of the tributary sites indicated on the map (page v). Sampling was begun in September, 1974, and was completed in October, 1975.

Stream flows are those reported by the U.S. Geological Survey (Anonymous, 1976) and are the average discharges for 54 years of record on the Stehekin River (U.S.G.S. station 12451000) and 71 years record on the Chelan River (U.S.G.S. station 124525000). Water diverted through the aqueduct is unmeasured, and flow is estimated by U.S.G.S. (station 12452000). The flow for Railroad Creek is that given in a previous report on Lake Chelan (Cunningham and Pine, 1968).

In this report, nutrient loads for sampled tributaries were calculated from mean annual concentrations and mean annual flows. Nutrient loads for unsampled "minor tributaries and immediate drainage" ("ZZ" of U.S.G.S.) were estimated using the mean concentrations in Stink Creek, Poison Creek, Twenty Five Mile Creek, Grade Creek, Prince Creek, and Moon Creek at stations C-1, D-1, E-1, F-1, G-1, and K-1 and the mean annual ZZ flow.

The operator of Manson waste treatment plant did not participate, and nutrient loads were estimated at 1.134 kg P and 3.401 kg N/capita/year.

A. Waste Sources:

1. Known municipal* -

Name	Pop. Served	Treatment	Mean Flow (m^3/d)	Receiving Water
Manson	400	3 septic tanks	34.1	Lake Chelan

2. Known industrial - None

B. Annual Total Phosphorus Loading - Average Year:

1. Inputs -

Source	kg P/yr	% of total
a. Tributaries (non-point load) -		
Stehekin River	17,870	51.5
Railroad Creek	2,005	5.8
b. Minor tributaries & immediate drainage (non-point load) -	11,875	34.2
c. Known municipal STP's -		
Manson	455	1.3
d. Septic tanks** -	145	0.4
e. Known industrial -	-	-
f. Direct precipitation*** -	2,345	6.8
Total	34,695	100.0

2. Outputs -

Lake outlet - Aqueduct	205
Chelan River	24,020
Total	24,225

3. Net annual P accumulation - 10,470 kg.

* Cunningham and Pine, 1968.
** Estimate based on 430 lakeshore dwellings, 11 campgrounds, and one park; see Working Paper No. 175.
*** See Working Paper No. 175.

C. Annual Total Nitrogen Loading - Average Year:

1. Inputs -

Source	kg P/yr	% of total
a. Tributaries (non-point load) -		
Stehekin River	810,425	61.1
Railroad Creek	100,800	7.6
b. Minor tributaries & immediate drainage (non-point load) -	264,720	19.9
c. Known municipal STP's -		
Manson	1,360	0.1
d. Septic tanks* -	5,390	0.4
e. Known industrial -	-	-
f. Direct precipitation** -	144,560	10.9
Total	1,327,255	100.0

2. Outputs -

Lake outlet -	Aqueduct	2,145
	Chelan River	301,175
	Total	303,320

3. Net annual P accumulation - 1,023,935 kg.

D. Non-point Nutrient Export by Subdrainage Area:

Tributary	kg P/km^2/yr	kg N/km^2/yr
Stehekin River	20	910
Railroad Creek	12	586

* Estimate based on 430 lakeshore dwellings, 11 campgrounds, and one park; see Working Paper No. 175.
** See Working Paper No. 175.

E. Mean Nutrient Concentrations in Ungaged Streams:

Tributary	Mean Total P Conc. (mg/l)	Mean Total N Conc. (mg/l)
Stink Creek	0.045	1.129
Poison Creek	0.020	0.248
Twenty Five Mile Creek	0.014	0.276
Grade Creek	0.020	0.130
Prince Creek	0.011	0.360
Mitchell Creek	0.026	0.720

F. Yearly Loads:

In the following table, the existing phosphorus loadings are compared to those proposed by Vollenweider (Vollenweider and Dillon, 1974). Essentially, his "dangerous" loading is one at which the receiving water would become eutrophic or remain eutrophic; his "permissible" loading is that which would result in the receiving water remaining oligotrophic or becoming oligotrophic if morphometry permitted. A mesotrophic loading would be considered one between "dangerous" and "permissible".

Note that Vollenweider's model may not be applicable to water bodies with short hydraulic retention times.

	Total Phosphorus		Total Nitrogen	
	Total	Accumulated	Total	Accumulated
grams/m^2/yr	0.26	0.08	9.9	7.6

Vollenweider phosphorus loading ($g/m^2/yr$) based on mean outflow and area of Lake Chelan:	
"Dangerous" (eutrophic loading)	0.40
"Permissible" (oligotrophic loading)	0.20

V. LITERATURE REVIEWED

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VI. APPENDICES

APPENDIX A

LAKE RANKINGS

LAKE DATA TO BE USED IN RANKINGS

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	SOO-MEAN SEC	MEAN CHLORA	15-MIN DO	MEDIAN DISS ORTHO P
5301	AMERICAN LAKE	0.027	0.105	343.000	4.822	15.000	0.007
5302	BANKS LAKE	0.021	0.040	364.533	7.373	10.800	0.007
5303	CHELAN LAKE	0.005	0.070	111.900	0.905	6.400	0.003
5304	DIAMOND LAKE	0.014	0.060	303.667	14.537	14.200	0.010
5305	GREEN LAKE	0.027	0.050	415.000	2.983	10.600	0.009
5306	KEECHELUS LAKE	0.007	0.040	280.250	1.400	9.200	0.002
5307	MAYFIELD LAKE	0.014	0.100	402.000	4.250	10.600	0.007
5308	MEDICAL LAKE	0.275	0.225	401.714	16.425	15.000	0.166
5309	MOSES LAKE	0.115	0.150	463.600	29.060	14.600	0.038
5310	OZETTE LAKE	0.010	0.110	403.333	1.225	7.200	0.009
5311	SAMMAMISH LAKE	0.015	0.210	374.000	7.290	14.600	0.006
5312	WHATCOM LAKE	0.009	0.320	288.000	3.422	10.800	0.009
5313	LOWER GRANITE RESERVOIR	0.033	0.150	435.500	4.875	7.200	0.022

PERCENT OF LAKES WITH HIGHER VALUES (NUMBER OF LAKES WITH HIGHER VALUES)

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500-M MEAN SEC	MEAN CHLORA	15-MIN DO	MEDIAN DISS ORTHO P	INDEX NO
5301	AMERICAN LAKE	29 (3)	50 (6)	67 (8)	50 (6)	4 (0)	58 (7)	258
5302	BANKS LAKE	42 (5)	100 (12)	58 (7)	25 (3)	46 (5)	71 (8)	342
5303	CHELAN LAKE	100 (12)	67 (8)	100 (12)	100 (12)	100 (12)	92 (11)	559
5304	DIAMOND LAKE	62 (7)	75 (9)	75 (9)	17 (2)	33 (4)	25 (3)	287
5305	GREEN LAKE	29 (3)	83 (10)	17 (2)	75 (9)	62 (7)	46 (5)	312
5306	KEECHELUS LAKE	92 (11)	92 (11)	92 (11)	83 (10)	75 (9)	100 (12)	534
5307	MAYFIELD LAKE	62 (7)	58 (7)	33 (4)	58 (7)	62 (7)	71 (8)	344
5308	MEDICAL LAKE	0 (0)	8 (1)	42 (5)	8 (1)	4 (0)	0 (0)	62
5309	MOSES LAKE	8 (1)	29 (3)	0 (0)	0 (0)	21 (2)	8 (1)	66
5310	OZETTE LAKE	75 (9)	42 (5)	25 (3)	92 (11)	87 (10)	33 (4)	354
5311	SAMMAMISH LAKE	50 (6)	17 (2)	50 (6)	33 (4)	21 (2)	83 (10)	254
5312	WHATCOM LAKE	83 (10)	0 (0)	83 (10)	67 (8)	46 (5)	46 (5)	325
5313	LOWER GRANITE RESERVOIR	17 (2)	29 (3)	8 (1)	42 (5)	87 (10)	17 (2)	200

LAKES RANKED BY INDEX NOS.

RANK	LAKE CODE	LAKE NAME	INDEX NO
1	5303	CHELAN LAKE	559
2	5306	KEECHELUS LAKE	534
3	5310	OZETTE LAKE	354
4	5307	MAYFIELD LAKE	344
5	5302	BANKS LAKE	342
6	5312	WHATCOM LAKE	325
7	5305	GREEN LAKE	312
8	5304	DIAMOND LAKE	287
9	5301	AMERICAN LAKE	258
10	5311	SAMMAMISH LAKE	254
11	5313	LOWER GRANITE RESERVOIR	200
12	5309	MOSES LAKE	66
13	5308	MEDICAL LAKE	62

APPENDIX B

CONVERSION FACTORS

CONVERSION FACTORS

Hectares x 2.471 = acres

Kilometers x 0.6214 = miles

Meters x 3.281 = feet

Cubic meters x 8.107×10^{-4} = acre/feet

Square kilometers x 0.3861 = square miles

Cubic meters/sec x 35.315 = cubic feet/sec

Centimeters x 0.3937 = inches

Kilograms x 2.205 = pounds

Kilograms/square kilometer x 5.711 = lbs/square mile

APPENDIX C

PHYSICAL and CHEMICAL DATA

STORET RETRIEVAL DATE 77/03/07

530301
47 50 33.0 120 03 04.0 3
CHELAN LAKE
53007 WASHINGTON
130591

/TYPA/AMBNT/LAKE

11EPALES 04001002
0029 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
75/04/02	14 30	0000		11.6	228	35	7.60	18	0.030	0.200K	0.050	0.002
	14 30	0005		11.6		35	7.60	19	0.020	0.200K	0.050	0.008K
	14 30	0015		11.6		35	7.60	21	0.020	0.200K	0.050	0.002
	14 30	0020		11.8		35	7.60	21	0.020	0.200K	0.050	0.002
	14 30	0025		12.0		35	7.50	20	0.020	0.200K	0.050	0.009K
75/07/21	14 45	0000	19.0	9.0	216	45	7.70	21	0.020	0.200K	0.020	0.010K
	14 45	0005	19.1	9.4		47	7.80	21	0.030	0.200K	0.020K	0.011K
	14 45	0020	18.3	9.6		49	7.80	22	0.020K	0.200K	0.020K	0.009K
	14 45	0038	13.0	10.2		41	7.80	22	0.020	0.200K	0.020K	0.012J
75/09/11	11 15	0000	20.2	9.8	432	43	7.70	22	0.020K	0.200K	0.020K	0.010
	11 15	0005	20.1	8.8		47	7.50	22	0.020K	0.200K	0.020K	0.004
	11 15	0020	18.7	9.6		46	7.70	21	0.020K	0.200K	0.020K	0.003
	11 15	0038	16.8	9.6		43	7.80	22	0.020K	0.200K	0.020K	0.005

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 77/03/07

530301
47 50 33.0 120 03 04.0 3
CHELAN LAKE
53007 WASHINGTON
130591

11EPALES 04001002
0029 FEET DEPTH CLASS 00

/TYPA/AMBNT/LAKE

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
75/04/02	14 30	0000	0.006	0.3	
	14 30	0005	0.007		
	14 30	0015	0.008		
	14 30	0020	0.006		
	14 30	0025	0.006		
75/07/21	14 45	0000	0.005	1.5	
	14 45	0005	0.005		
	14 45	0020	0.005		
	14 45	0038	0.021		
75/09/11	11 15	0000	0.011	1.3	
	11 15	0005	0.005		
	11 15	0020	0.005		
	11 15	0038	0.010		

STORET RETRIEVAL DATE 77/03/07

530302
47 52 34.0 120 10 40.0 3
CHELAN LAKE
53007 WASHINGTON
130591

/TYPA/AMBNT/LAKE

11EPALES 04001002
0999 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
75/04/02	13 40	0000		11.4	372	35	7.60	16	0.020	0.200K	0.060	0.002K
	13 40	0005		11.6		35	7.60	14	0.030	0.200K	0.060	0.004
	13 40	0065		11.8		35	7.60	15	0.020	0.200	0.050	0.002K
	13 40	0120		11.4		34	7.50	16	0.020	0.200K	0.050	0.002K
	13 40	0170		11.4		34	7.30	15	0.030	0.200K	0.060	0.004
	13 40	0220		11.2		33	7.50	16	0.030	0.200K	0.060	0.002K
75/07/21	15 10	0000	18.2	11.0	252	43	7.55	25	0.020	0.200K	0.020K	0.009K
	15 10	0005	17.4	9.4		45	7.65	24	0.020K	0.200	0.020K	0.007K
	15 10	0020	16.4	10.2		42	7.75	23	0.020K	0.200K	0.020	0.010K
	15 10	0050	13.3	10.8		41	7.95	22	0.020	0.200	0.030	0.011K
	15 10	0090	11.0	10.6		38	7.95	25	0.040	0.200K	0.030	0.010K
	15 10	0130	7.5	11.2		34	7.50	26	0.020	0.200	0.050	0.009K
	15 10	0175	4.9	10.6		37	7.30	25	0.020	0.200K	0.060	0.009K
75/09/11	11 45	0000	19.9		454	49	7.75	21	0.020K	0.200K	0.020K	0.003
	11 45	0005	19.9	8.6		47	7.90	22	0.020K	0.600	0.020K	0.002
	11 45	0020	18.6	9.6		47	8.00	23	0.020K	0.300	0.020K	0.002
	11 45	0050	16.2	9.8		43	7.70	21	0.020K	0.200K	0.020K	0.002
	11 45	0090	14.2	10.0		43	7.45	23	0.020K	0.200K	0.020	0.002
	11 45	0135	9.6	10.0		41	7.30	21	0.020K	0.200K	0.060	0.002
	11 45	0175	7.0	10.0		33	7.15	23	0.020K	0.200K	0.070	0.003

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 77/03/07

530302
47 52 34.0 120 10 40.0 3
CHELAN LAKE
53007 WASHINGTON
130591

/TYPA/AMONT/LAKE

11EPALES 04001002
0999 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
75/04/02	13 40	0000	0.007	0.3	
	13 40	0005	0.005		
	13 40	0065	0.007		
	13 40	0120	0.006		
	13 40	0170	0.005		
	13 40	0220	0.006		
75/07/21	15 10	0000	0.006	1.2	
	15 10	0005	0.005		
	15 10	0020	0.006		
	15 10	0050	0.005		
	15 10	0090	0.005		
	15 10	0130	0.005		
	15 10	0175	0.005		
75/09/11	11 45	0000	0.005	1.3	
	11 45	0005	0.004		
	11 45	0020	0.005		
	11 45	0050	0.005		
	11 45	0090	0.004		
	11 45	0135	0.005		
	11 45	0175	0.004		

STORET RETRIEVAL DATE 77/03/07

530303
47 59 40.0 120 13 40.0 3
CHELAN LAKE
53007 WASHINGTON
130591

/TYPA/AMBNT/LAKE

11EPALES 04001002
0999 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
75/04/02	11 25	0000		11.2	432	34	7.40	20	0.020	0.200K	0.080	0.002
	11 25	0005		10.8		34	7.45	20	0.020K	0.200K	0.070	0.002K
	11 25	0075		11.2		34	7.30	24	0.030	0.200K	0.080	0.006
	11 25	0120		11.0		34	7.30	21	0.020	0.200K	0.080	0.003
	11 25	0170		11.4		34	7.30	17	0.030	0.200K	0.080	0.004
	11 25	0220		11.0		34	7.25	17	0.020	0.200K	0.080	0.002
75/07/21	12 55	0000	14.4	9.6	252	43	7.60	29	0.040	0.200K	0.050	0.005
	12 55	0005	13.2	10.6		41	7.90	28	0.020		0.040	0.003
	12 55	0025	12.3	10.2		41	7.90	30	0.030	0.200K	0.040	0.004
	12 55	0060	11.7	10.6		37	7.70	29	0.020	0.200K	0.040	0.010K
	12 55	0090	11.1	11.4		39	7.60	39	0.030	0.200K	0.050	0.012K
	12 55	0135	8.4	11.0		37	7.40	18	0.030	0.200K	0.050	0.010K
	12 55	0175	7.3	11.6		37	7.55	21	0.030	0.200K	0.060	0.013K
75/09/12	09 15	0000	19.3	8.6	600	49	7.15	20	0.020K	0.200K	0.020K	0.003
	09 15	0005	19.3	9.2		47	7.25	20	0.020K	0.200K	0.020K	0.003
	09 15	0015	18.9	9.6		49	7.30	20	0.020K	0.200K	0.020K	0.002
	09 15	0035	16.5	9.6		45	7.40	19	0.020K	0.200K	0.020K	0.002
	09 15	0063	15.4	9.8		43	7.35	16	0.020K	0.200K	0.020K	0.002
	09 15	0100	12.5	10.3		39	7.25	19	0.020K	0.200K	0.040	0.003
	09 15	0135	11.0	10.8		39	7.10	18	0.020K	0.200K	0.050	0.002
	09 15	0175	9.2	10.8		37	7.05	18	0.020K	0.200K	0.060	0.002

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 77/03/07

530303
47 59 40.0 120 13 40.0 3
CHELAN LAKE
53007 WASHINGTON
130591

/TYPA/AMBNT/LAKE

11EPALES 04001002
0999 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
75/04/02	11	25 0000	0.009	0.3	
	11	25 0005	0.006		
	11	25 0075	0.010		
	11	25 0120	0.007		
	11	25 0170	0.006		
	11	25 0220	0.005		
75/07/21	12	55 0000	0.005	1.7	
	12	55 0025	0.006		
	12	55 0060	0.008		
	12	55 0090	0.005		
	12	55 0135	0.005		
	12	55 0175	0.005		
75/09/12	09	15 0000	0.004	1.2	
	09	15 0005	0.004		
	09	15 0015	0.004		
	09	15 0035	0.004		
	09	15 0063	0.004		
	09	15 0100	0.004		
	09	15 0135	0.005		
	09	15 0175	0.004		

STORET RETRIEVAL DATE 77/03/07

530304
48 02 18.0 120 22 37.0 3
CHELAN LAKE
53007 WASHINGTON
130591

/TYPA/AMHNT/LAKE

11EPALES 04001002
0999 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
75/04/02	10 40	0000		11.2	432	33	7.30	14	0.020	0.200K	0.080	0.002
	10 40	0005		11.2		33	7.20	14	0.020	0.200K	0.080	0.002K
	10 40	0075		11.2		33	7.30	14	0.020K	0.200K	0.080	0.002K
	10 40	0120		11.2		34	7.30	18	0.030	0.200K	0.080	0.004
	10 40	0170		11.4		33	7.30	19	0.020K	0.200K	0.080	0.002K
	10 40	0220		11.0		32	7.10	20	0.020	0.200K	0.080	0.003
75/09/12	09 45	0000	18.5	9.0	600	47	7.10	20	0.020K	0.200K	0.020K	0.002
	09 45	0005	18.5	9.0		47	7.30	20	0.020K	0.200K	0.020K	0.002
	09 45	0025	17.7	9.2		45	7.40	21	0.020K	0.200K	0.020K	0.002
	09 45	0055	15.7			43	7.40	24	0.020	0.300	0.030	0.002
	09 45	0090	14.1	9.4		37	7.20	23	0.020K	0.200K	0.030	0.004
	09 45	0130	10.7	10.8		37	7.10	23	0.020K	0.200K	0.050	0.003
	09 45	0175	9.2	11.2		37	6.90	19	0.020	0.200K	0.060	0.003

K VALUE KNOWN TO BE
LESS THAN INDICATED

97

STORET RETRIEVAL DATE 77/03/07

530304
48 02 18.0 120 22 37.0 3
CHELAN LAKE
53007 WASHINGTON
130591

/TYPA/AMBNT/LAKE

11EPALES 04001002
0999 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
75/04/02	10 40	0000	0.007	0.3	
	10 40	0005	0.005		
	10 40	0075	0.006		
	10 40	0120	0.011		
	10 40	0170	0.007		
	10 40	0220	0.008		
75/09/12	09 45	0000	0.004	0.9	
	09 45	0005	0.004		
	09 45	0025	0.004		
	09 45	0055	0.008		
	09 45	0090	0.005		
	09 45	0130	0.005		
	09 45	0175	0.005		

STORET RETRIEVAL DATE 77/03/07

530305
48 12 05.0 120 30 12.0 3
CHELAN LAKE
53007 WASHINGTON
130591

/TYPA/AMBNT/LAKE

11EPALES 04001002
0999 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
75/04/02	09 45	0000		11.0	348	33	7.30	14	0.020	0.200K	0.070	0.003
	09 45	0005		11.0		33	7.15	14	0.020	0.200K	0.070	0.002
	09 45	0060		11.2		33	7.15	12	0.030	0.200K	0.070	0.004
	09 45	0115		11.2		33	7.20	11	0.030	0.200K	0.080	0.004
	09 45	0170		11.0		31	7.20	16	0.020	0.200K	0.080	0.002K
	09 45	0220		11.2		32	7.25	15	0.020	0.200K	0.080	0.004
75/07/21	12 20	0000	11.1	10.6	192	37	7.50	25	0.020K	0.200K	0.050	0.00HK
	12 20	0005	11.0	11.1		37	7.60	24	0.020K	0.200K	0.050	0.009K
	12 20	0025	10.9	11.0		37	7.60	26	0.030	0.200K	0.050	0.004
	12 20	0060	10.2	10.8		37	7.65	24	0.020	0.200K	0.050	0.009K
	12 20	0090	9.2	10.8		37	7.65	27	0.020	0.200K	0.050	0.011K
	12 20	0135	7.8	11.2		37	7.70	28	0.020	0.200K	0.060	0.012K
	12 20	0175	7.1	11.2		35	7.60	27	0.040	0.200K	0.080	0.011K
75/09/12	10 15	0000	17.6	9.3	600	45	7.00	19	0.020K	0.200	0.020	0.002
	10 15	0005	17.5	9.4		45	7.00	20	0.020K	0.200K	0.020K	0.002
	10 15	0015	17.4	9.2		43	7.00	19	0.020K	0.200K	0.020K	0.002
	10 15	0030	17.3	9.6		45	7.20	20	0.020K	0.200K	0.020K	0.004
	10 15	0058	15.8	9.8		43	7.20	20	0.020K	0.200K	0.020	0.002
	10 15	0090	14.4	9.8		41	7.15	19	0.020K	0.200	0.020	0.002
	10 15	0135	10.6	11.1		37	7.10	20	0.020K	0.200K	0.040	0.002
	10 15	0175	9.1	10.7		37	7.10	19	0.020K	0.200K	0.060	0.002

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 77/03/07

530305
48 12 05.0 120 30 12.0 3
CHELAN LAKE
53007 WASHINGTON
130591

/TYPA/AMOUNT/LAKE

11EPALES 04001002
0999 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
75/04/02	09 45	0000	0.006	0.3	
	09 45	0005	0.005		
	09 45	0060	0.006		
	09 45	0115	0.005		
	09 45	0170	0.005		
	09 45	0220	0.006		
75/07/21	12 20	0000	0.005	1.4	
	12 20	0005	0.005		
	12 20	0025	0.005		
	12 20	0060	0.005		
	12 20	0090	0.005		
	12 20	0135	0.005		
	12 20	0175	0.007		
75/09/12	10 15	0000	0.004	1.0	
	10 15	0005	0.006		
	10 15	0015	0.005		
	10 15	0030	0.005		
	10 15	0058	0.004		
	10 15	0090	0.005		
	10 15	0135	0.004		
	10 15	0175	0.004		

STORET RETRIEVAL DATE 77/03/07

530306
48 20 20.0 120 34 40.0 3
CHELAN LAKE
53007 WASHINGTON
130591

/TYPA/AMONT/LAKE

11EPALES 04001002
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
75/04/01	14	25 0000		11.2	432	32	7.30	25	0.020	0.200K	0.070	0.003
	14	25 0005		11.4		33	7.15	23	0.020	0.200K	0.070	0.002
	14	25 0075		11.2		33	7.30	19	0.020	0.200K	0.070	0.002
	14	25 0120		11.4		32	7.35	16	0.030	0.200K	0.070	0.002
	14	25 0170		11.2		33	7.30	14	0.020	0.200K	0.070	0.006K
	14	25 0220		11.2		34	7.30	14	0.020	0.200K	0.070	0.002
75/07/21	14	50 0000	11.3	11.2	180	39	7.70	23	0.020	0.200K	0.050	0.004
	14	50 0005	11.1	11.2		37	7.55	23	0.020	0.200K	0.050	0.011K
	14	50 0020	10.6	10.8		37	7.40	23	0.020	0.200K	0.050	0.005
	14	50 0050	9.8	11.0		38	7.70	23	0.020K	0.200K	0.050	0.011K
	14	50 0090	9.0	11.0		37	7.70	27	0.020	0.200K	0.050	0.010K
	14	50 0130	8.3	11.2		33	7.60	24	0.030	0.200K	0.060	0.005
	14	50 0175	7.5	11.2		35	7.40	24	0.020	0.200K	0.060	0.009K
75/09/11	13	15 0000	16.4	9.8	600	43	7.50	38	0.020K	0.200K	0.020	0.002K
	13	15 0005	16.6			42	7.40	38	0.020K	0.200K	0.020	0.002K
	13	15 0025	15.8	10.4		39	7.80	38	0.020K	0.200K	0.020	0.002
	13	15 0055	14.8	9.8		39	7.80	38	0.020K	0.200K	0.020	0.002
	13	15 0090	13.4	10.0		38	7.55	31	0.020K	0.200K	0.020	0.002K
	13	15 0130	11.3	10.6		35	7.30	19	0.020K	0.200K	0.060	0.005
	13	15 0175	9.2	10.8		36	7.15	19	0.020K	0.200K	0.060	0.003

K VALUE SHOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 77/03/07

530306
48 20 28.0 120 34 40.0 3
CHELAN LAKE
53007 WASHINGTON
130591

/TYPA/AMBNT/LAKE

11EPALES 04001002
0999 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
75/04/01	14	25 0000	0.009	0.3	
	14	25 0005	0.006		
	14	25 0075	0.006		
	14	25 0120	0.005		
	14	25 0170	0.006		
	14	25 0220	0.006		
75/07/21	14	50 0000	0.005	0.9	
	14	50 0005	0.005		
	14	50 0020	0.006		
	14	50 0050	0.006		
	14	50 0090	0.007		
	14	50 0135	0.005		
	14	50 0175	0.005		
75/09/11	13	15 0000	0.003	1.4	
	13	15 0005	0.003		
	13	15 0025	0.003		
	13	15 0055	0.003		
	13	15 0090	0.003		
	13	15 0130	0.006		
	13	15 0175	0.004		

STORET RETRIEVAL DATE 77/03/07

530307
48 18 21.0 120 39 30.0 3
CHELAN LAKE
53007 WASHINGTON
130591

/TYPA/AMBNT/LAKE

11EPALES 04001002
0999 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
75/04/01	13 15	0000	5.8	11.0	360	31	7.30	18	0.030	0.200	0.090	0.003
	13 15	0005		11.0		33	7.30	20	0.020K	0.200K	0.070	0.002K
	13 15	0060		11.2		33	7.20	21	0.020K	0.200K	0.070	0.009K
	13 15	0100	5.7	11.2		33	7.15	20	0.020K	0.200K	0.070	0.002
	13 15	0150	5.7	11.2		33	7.25	19	0.020	0.200K	0.070	0.002
	13 15	0220	5.7	11.2		33	7.30	21	0.020K	0.200K	0.060	0.002K
75/07/21	11 00	0000	9.6	10.8	180	29	7.60	23	0.030	0.200K	0.060	0.013K
	11 00	0005	9.4			35	7.60	23	0.020	0.200K	0.050	0.011K
	11 00	0020	9.2	11.2		35	7.60	21	0.020	0.200K	0.050	0.011K
	11 00	0050	8.8	11.0		35	7.60	23	0.020	0.200K	0.050	0.012K
	11 00	0090	8.5	11.4		33	7.60	22	0.020	0.200K	0.050	0.015K
	11 00	0135	7.9	11.0		33	7.60	22	0.030	0.200K	0.060	0.005K
	11 00	0175	7.1	9.0		29	7.60	22	0.020	0.200K	0.060	0.011K
75/09/11	12 40	0000	16.8	9.8	600	42	7.35	32	0.020K	0.200K	0.030	0.002
	12 40	0005	16.1	10.0		38	7.20	45	0.020	0.200	0.030	0.008
	12 40	0025	15.9	10.0		38	7.10	28	0.020K	0.200K	0.020	0.003
	12 40	0055	14.5	9.8		38	7.10	29	0.020K	0.200K	0.020	0.002
	12 40	0090	13.4	10.2		37	7.00	29	0.020K	0.200K	0.020	0.002
	12 40	0130	10.2	10.8		35	7.00	28	0.020K	0.200K	0.040	0.002K
	12 40	0175	9.2	10.8		33	7.00	29	0.020K	0.200K	0.060	0.002

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 77/03/07

530307
48 18 21.0 120 39 30.0 3
CHELAN LAKE
53007 WASHINGTON
130591

/TYPA/AMBNT/LAKE

11EPALES 04001002
0999 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
75/04/01	13 15	0000	0.009	0.3	
	13 15	0005	0.007		
	13 15	0060	0.006		
	13 15	0100	0.007		
	13 15	0150	0.007		
	13 15	0220	0.002		
75/07/21	11 00	0000	0.007	1.0	
	11 00	0005	0.006		
	11 00	0020	0.006		
	11 00	0050	0.006		
	11 00	0090	0.006		
	11 00	0135	0.005		
	11 00	0175	0.005		
75/09/11	12 40	0000	0.003	1.2	
	12 40	0005	0.006		
	12 40	0025	0.004		
	12 40	0055	0.006		
	12 40	0090	0.004		
	12 40	0130	0.003		
	12 40	0175	0.003		

APPENDIX D

TRIBUTARY DATA

STORET RETRIEVAL DATE 77/03/07

5303A1
47 50 05.0 120 00 35.0 4
CHELAN RIVER
53 7.5 CHELAN
O/LAKE CHELAN 130591
BANK SMPL BELOW LAKE CHELAN DAM
11EPALES 04001004
0000 FEET DEPTH CLASS 00

/TYPA/AMBNT/STREAM

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/09/21	11	45	0.020	0.100K	0.010	0.005K	0.005K
74/10/06	12	15	0.020	0.100	0.010	0.005K	0.010
74/11/03	10	20	0.016	0.300	0.024	0.008K	0.010K
75/06/07	12	20	0.150	0.050K	0.010	0.007	0.014
75/07/03	11	35	0.010	0.100	0.005	0.005K	0.010
75/08/09	11	35	0.015	0.100	0.020	0.005	0.030

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 77/03/07

530381
47 48 30.0 119 59 07.0 4
PENSTOCK AQUADUCT
53 7.5 CHELAN
0/LAKE CHELAN 130591
OUTLET OF CHELAN PENSTOCK POWERHOUSE
11EPALES 04001004
0000 FEET DEPTH CLASS 00

/TYPA/AMBNT/STREAM

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/09/21	13 45		0.016	0.100K	0.020	0.005K	0.005K
74/10/06	09 05		0.008	0.100K	0.010	0.005K	0.010
74/11/03	10 00		0.016	0.200	0.008K	0.008K	0.010K
74/12/08	14 15		0.032	0.200	0.007	0.005	0.010K
75/01/05	15 00		0.056	0.100K	0.008K	0.005K	0.020
75/02/02	15 05		0.125	0.100K	0.008	0.008K	0.010K
75/06/07	09 15		0.005	0.050	0.010	0.005K	0.010K
75/07/03	12 00		0.010	0.150	0.005	0.005K	0.010
75/08/09	11 00		0.005	0.150	0.020	0.025	0.050

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 77/03/07

5303C1
47 55 40.0 120 11 10.0 4
STINK CREEK
53 7.5 MANSON
T/LAKE CHELAN 130591
BRIDGE ON GREEN AVE .5 MI SE GREENS LONG
11EPALES 04001004
0000 FEET DEPTH CLASS 00

/TYPA/AMBNT/STREAM

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/09/21	14	50	0.028	0.800	0.020	0.025	0.040
74/10/06	14	24	0.020	0.800	0.010	0.010	0.030
74/11/03	13	15	0.104	0.700	0.024	0.008	0.020
74/12/08	11	27	0.312	0.900	0.045	0.015	0.020
75/01/05	11	27	0.448	1.800	0.136	0.015	0.040
75/02/02	11	00	0.525	0.800	0.040	0.016	0.030
75/02/18	18	00	0.478	1.100	0.160	0.024	0.040
75/05/10	19	00	0.100	0.800	0.050	0.045	0.050
75/06/08	10	53	0.060	0.700	0.035	0.040	0.050
75/07/03	10	56	0.020	0.950	0.025	0.025	0.050
75/08/09	12	10	0.175	0.800	0.030	0.100	0.130

STORET RETRIEVAL DATE 77/03/07

530301
48 49 55.0 120 13 05.0 4
POISON CREEK
53 7.5 OSS PEAK
T/LAKE CHELAN 130591
BRIDGE ON GRADE CRK RD 17.5 M NNW MANSON
11EPALES 04001004
0000 FEET DEPTH CLASS 00

/TYPA/AMBNT/STREAM

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/09/21	16	00	0.068	0.100K	0.020	0.020	0.020
74/10/06	16	10	0.048	0.100K	0.005	0.010	0.015
74/11/03	14	47	0.048	0.300	0.040	0.016	0.016
74/12/08	10	27	0.080	0.100K	0.005	0.015	0.015
75/05/10	16	45	0.145	0.500	0.020	0.017	0.040
75/06/07	12	24	0.040	0.075	0.020	0.015	0.015
75/07/03	09	40	0.030	0.100	0.025	0.015	0.020

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 77/03/07

530JE1
48 59 25.0 120 15 25.0 4
TWENTYFIVE MILE CREEK
53 7.5 STORMY MT
T/LAKE CHELAN
BRDG .7 MI SE OF 25 MILE CREEK GUART STA
11EPALES 0406100
0000 FEET DEPTH CLASS 00

/TYPA/AMBNT/STREAM

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/09/21	09 45		0.050	0.100K	0.015	0.015	0.015
74/10/06	11 28		0.064	0.100K	0.005K	0.010	0.010
74/11/03	11 15		0.024	0.100K	0.008	0.008	0.010K
74/12/08	16 05		0.040	0.100K	0.005K	0.010	0.020
75/01/05	12 24		0.072	0.900	0.272	0.015	0.020
75/02/02	12 30		0.060	0.100K	0.008	0.008	0.010K
75/02/18	16 30		0.037	0.100	0.008	0.008	0.010K
75/05/10	20 15		0.140	0.400	0.045	0.025	0.025
75/06/07	15 15		0.100	0.150	0.015	0.005	0.010K
75/07/03	14 15		0.015	0.100	0.010	0.010	0.010

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 77/03/07

530FI
48 33 05.0 120 15 35.0 4
GRADE CREEK
53 7.5 S NAVAHRE PK
T/LAKE CHELAN 130591
BRDG ON GRADE CRK HD 21 MI NW OF MANSON
11EPALES 04001004
0000 FEET DEPTH CLASS 00

/TYPA/AMBNT/STREAM

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/09/21	16 30		0.016	0.100K	0.015	0.006	0.010
74/10/06	15 48		0.132	0.100	0.010	0.005	0.010K
75/05/10	16 30		0.035	0.150	0.020	0.010	0.050
75/07/04	09 57		0.005	0.050	0.005	0.010	0.020
75/08/09	15 35		0.010	0.050K	0.020	0.010	0.010

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 77/03/07

530301
48 08 50.0 120 29 45.0 4
PRINCE CREEK
53 7.9 PRINCE CREEK
T/LAKE CHELAN 130591
600 FT DOWN TRAIL AT PRINCE CRK CAMPGRND
11EPALES 04001004
0000 FEET DEPTH CLASS 00

/TYPA/AMHNT/STREAM

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
75/01/14	13	00	0.072	0.100K	0.024	0.008K	0.010K
75/02/19	13	15	0.016	0.500	0.008K	0.008K	0.010K
75/03/19	12	30	0.050	0.250	0.050	0.009	0.010K
75/04/18	13	30	0.005	0.650	0.040	0.005K	0.010K
75/05/10	11	00	0.020	0.750	0.020	0.005K	0.010K
75/06/29	15	30	0.005	0.250	0.030	0.005	0.010K
75/07/19	16	00	0.010	0.150	0.030	0.005K	0.010K
75/10/01	11	15	0.010	0.300	0.035	0.005	0.010K
75/10/20	14	00	0.005	0.100	0.010	0.005K	0.020

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 77/03/07

530301
48 17 05.0 120 35 40.0 4
RAILROAD CREEK
53 15 LUCERNE
T/LAKE CHELAN 130591
BRIDGE ON MEDIUM DUTY RD IN LUCERNE
11EPALES 04001004
0000 FEET DEPTH CLASS 00

/TYPA/AMBNT/STREAM

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
75/01/14	12 45		0.010	0.600	0.350	0.008K	0.010K
75/02/19	12 30		0.008	0.500	0.008K	0.008K	0.010K
75/03/19	12 00		0.075	0.550	0.020	0.005K	0.010
75/04/18	12 15		0.075	0.050K	0.035	0.005K	0.010K
75/05/10	11 15		0.375	0.150	0.010	0.005	0.010K
75/06/24	13 00		0.065	1.350	0.030	0.005K	0.010K
75/07/19			0.040	0.550	0.035	0.005K	0.010
75/10/01	10 00		0.050	0.300	0.030	0.005K	0.010K
75/10/20	13 00		0.040	0.100K	0.010	0.005K	0.020

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 77/03/07

5303J1
48 20 25.0 120 42 30.0 4
STEHEKIN RIVER
53 CHELAN CO MAP
T/LAKE CHELAN 130591
BRIDGE ON SEC RD 4.9 M NW OF STEHEKIN
11EPALES 04001004
0000 FEET DEPTH CLASS 00

/TYPA/AMBNT/STREAM

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
75/01/14	11 30		0.088	0.500	0.032	0.008K	0.010K
75/02/19	09 00		0.088	0.100	0.008K	0.008K	0.010K
75/03/19	09 00		0.085	0.450	0.160	0.005K	0.010
75/04/14	09 30		0.055	0.350	0.035	0.005K	0.010K
75/06/23	10 15		0.080	1.500	0.020	0.005K	0.010K
75/07/14	10 00		0.045	0.350	0.020	0.005K	0.035
75/09/19	11 00		0.055	0.700	0.040	0.005K	0.010K

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 77/03/07

53U3K1
47 59 45.0 120 09 35.0 4
MITCHELL CREEK
53 7.5 MANSON
T/LAKE CHELAN 130591
AT SHADE CRK RD XING 2 MI N ANTILON LAKE
11EPALES 04001004
6800 FEET DEPTH CLASS 00

/TYPA/AMBNT/STREAM

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/09/21	15 30		0.720	0.100K	0.010	0.010	0.020
74/10/06	16 41		0.860	0.100K	0.005K	0.025	0.030
74/11/03	14 53		0.760	0.100	0.008K	0.024	0.024
74/12/08	11 05		0.810	0.100K	0.005K	0.030	0.030
75/01/05	10 47		0.780	0.130	0.632	0.025	0.030
75/05/10	17 15		0.375	0.300	0.015	0.020	
75/06/07	13 00		0.280	0.050K	0.010	0.015	0.020
75/07/03	09 15		0.345	0.150	0.005	0.015	0.020
75/08/09	13 00		0.390	0.150	0.010	0.030	

K VALUE KNOWN TO BE
LESS THAN INDICATED